CBO TESTIMONY

Statement of
Robert F. Hale
Assistant Director
National Security Division
Congressional Budget Office

before the
Subcommittee on
Conventional Forces and Alliance Defense
Committee on Armed Services
United States Senate

April 22, 1991

NOTICE

This statement is not available for public release until it is delivered at 2:30 p.m. (EDT), Monday, April 22, 1991.

CONGRESSIONAL BUDGET OFFICE
SECOND AND D STREETS, S.W.
WASHINGTON, D.C. 20515

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
22 APR 1991		**00-00-1991 to 00-00-1991**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Statement of Robert F. Hale Assistant Director National Security Division Congressional Budget Office before the Subcommittee on Conventional Forces and Alliance Defense Committee on Armed Service United States Senate	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Congressional Budget Office ,Ford House Office Building, 4th Floor ,Second and D Streets, SW ,Washington,DC,20515-6925**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**43**	

I appreciate the opportunity to testify today about the future of tactical fighter forces in the Air Force. The Department of Defense (DoD) plans to announce, perhaps as early as tomorrow, which of two teams of contractors will develop its newest top-of-the-line fighter aircraft, the Advanced Tactical Fighter (ATF). The Congress will then decide whether the Advanced Tactical Fighter should enter full-scale development, the final stage before production. The Air Force is also beginning development of a Multirole Fighter, a relatively less capable plane that will eventually replace today's F-16 aircraft.

These important decisions will shape the Air Force's stock of tactical fighters for decades to come. Moreover, the decisions must be made during a period of great uncertainty about the future of Soviet military plans as well as uncertainty about limits on our own future defense funding. They will also take place during a period when the number of U.S. tactical fighter forces will undergo major reductions.

Although my testimony today addresses many issues pertaining to Air Force tactical fighters, it focuses primarily on affordability--that is, the ability of the Air Force to meet its numerical needs for aircraft. The testimony reaches three broad conclusions:

- Under the budget plan the Administration is proposing, the Air Force should be able to meet its numerical requirements for tactical aircraft through 1999;

- However, a decision to pursue the Advanced Tactical Fighter makes it likely that, starting in the next decade, the Air Force will either fall short of aircraft or will require added funding for tactical aircraft; and

- To minimize long-term problems, the Administration should consider buying aircraft other than the Advanced Tactical Fighter or buying fewer of the new fighter; perhaps most important, the Administration must limit the costs of the Multirole Fighter.

KEY TYPES OF AIRCRAFT

Air Force tactical fighter forces are designed to destroy enemy aircraft in the air and to attack targets on the ground. Tactical fighters are organized into wings, each of which contains about 72 operational aircraft. Currently, the Air Force has the equivalent of 35 tactical fighter wings. To accommodate

budget constraints and to reflect reduced security threats, DoD plans to reduce that number to about 26 wings by 1995.

Of the seven types of aircraft that make up the Air Force's tactical fighter forces, this testimony focuses on the four that are most important to the debate--two existing aircraft and two new planes.

Existing Aircraft

Two aircraft--the F-15 and the F-16--are the mainstays of today's tactical fighter fleet.

F-15 Eagle. The F-15 Eagle is currently the Air Force's top-of-the-line fighter. Developed in the late 1960s, it first entered production in 1973. To date, a total of 1,074 F-15 aircraft have been purchased.

The F-15 aircraft is a twin-engine, supersonic fighter capable of attacking enemy aircraft that are outside of a pilot's visual range. A variation of the F-15, the F-15E Strike Eagle, has sophisticated capabilities for attacking targets on the ground: advanced avionics, long flight ranges, and substantial capability to attack targets at night and in bad weather.

Because the Administration intends to replace the F-15 aircraft with the Advanced Tactical Fighter, it plans no further purchases of F-15 planes. The Strike Eagle, the latest version that was purchased, had an average procurement cost of about $45 million apiece. (All costs in this testimony are expressed in constant 1992 dollars of budget authority.)

F-16 Falcon. Compared with the F-15, the F-16 Falcon is relatively cheaper and less capable. All F-16 aircraft are designed to attack both enemy aircraft in the air and targets on the ground. The F-16 aircraft attacks targets in the air with a short-range missile or a gun, giving it less range than the F-15 in air-to-air combat. The Falcon has less complex avionics, and less sophisticated ground attack capabilities, than those of the Strike Eagle.

The Falcon is also considerably less expensive than the Eagle. The F-16 aircraft costs an average of about $20 million to procure compared with $45 million for the E model of the F-15. Under Administration plans, the last F-16 aircraft will be purchased in 1993. By then, about 2,200 Falcon aircraft will have been bought.

New Aircraft

Under the Administration's plans, the Air Force tactical fighter fleet will eventually consist primarily of two aircraft: the Advanced Tactical Fighter and the Multirole Fighter.

Advanced Tactical Fighter. The Advanced Tactical Fighter is a new generation of aircraft. The plane is designed to have stealth capability--that is, be very difficult to detect using a variety of sensors including radar and infrared or heat detectors. ATF development will probably emphasize limits on the plane's detectability by radar. To limit detectability by radar, the aircraft would be shaped to direct reflections of radar beams away from enemy radars; the use of special materials and coatings would also limit reflections. Designers will also attempt to limit detectability by infrared sensors by, among other things, decreasing the heat emitted from the plane's engines. Efforts would also be made to limit the plane's own electronic emissions.

The Advanced Tactical Fighter will also have the ability to accelerate to, and cruise at, supersonic speeds without having to rely on the extra power of an afterburner. This capability, which the Air Force terms "supercruise," greatly increases the time the aircraft can fly at supersonic speeds by minimizing reliance on afterburners, which make inefficient use of fuel. The

supercruise technology would also help increase the ATF's range and might enable the plane to carry more weapons. Finally, compared with previous generations of aircraft, the Advanced Tactical Fighter will have more highly integrated avionics, thus providing more information and in a manner that reduces the pilot's workload.

Eventually, the Advanced Tactical Fighter will replace the F-15 aircraft as the top-of-the-line fighter designed to attack enemy planes in the air. A variation of the Advanced Tactical Fighter might also eventually replace today's F-15E and F-111 aircraft, which are designed to accomplish long-range bombing missions. Alternatively, these long-range bombers might be replaced with the AX aircraft, an attack plane that the Administration will reportedly propose buying for the Navy.

The initial stages of developing the ATF aircraft are largely complete. If the Congress approves, the ATF program will enter full-scale development, the final step before it goes into production in the last quarter of this year. Under current plans, production will begin in 1997. The first operational squadron of ATF aircraft (consisting of 24 planes) would be fielded around the year 2000.

The ATF program would be costly. According to current estimates, funding for development will total $16.1 billion. If the Air Force carries out its current plan to buy 750 Advanced Tactical Fighters, each would cost an average of about $73 million to buy. These estimates of costs for development and procurement have increased over last year's levels by about 16 percent and 17 percent, respectively. Much of this increase probably results from changes that achieve a more gradual pace of development and production than was envisioned a year ago.

The Multirole Fighter. Just this year, the Air Force announced its intention to develop a new Multirole Fighter (MRF), a follow-on to the F-16 aircraft. Presumably, this aircraft would require a number of years to develop and would enter production sometime early in the next century.

Because it is a new program, much less is known about the cost and design of the Multirole Fighter than the Advanced Tactical Fighter. The Air Force, however, probably would want the new plane to have stealth capabilities. In addition, as it has done in the ATF program, the Air Force may wish to incorporate other improvements in capability over the F-16 aircraft, such as increases in range and ability to carry munitions, maneuverability, speed, and accuracy in delivering weapons.

What might a Multirole Fighter cost? An Air Force briefing indicates that the service intends to try to make the Multirole Fighter as affordable as possible. That intention would, however, conflict with the Air Force's desire to achieve improvements in capability. History also suggests that, if the Air Force develops an entirely new plane as its Multirole Fighter, then the plane will cost substantially more than the F-16 aircraft. Since World War II, each new generation of tactical fighter aircraft has cost at least 80 percent more than its predecessor. Indeed, many new generations have cost two to three times more.

Alternatively, the Air Force could create a Multirole Fighter by improving the existing F-16 aircraft. If history is a guide, such an aircraft would be substantially cheaper than an entirely new plane; modifications to existing aircraft have generally not added as much to costs. At the same time, there is a trade-off: a modified F-16 aircraft would have less capability than an entirely new aircraft.

TACTICAL FIGHTERS AND THREATS TO U.S. SECURITY

In deciding whether or not to buy new fighters, and how many to buy, the Administration and the Congress must consider the future threats that these

aircraft will confront. Unfortunately, the nature of these threats is highly uncertain.

Threats from the Soviet Union

In view of its current state of turmoil, the Soviet Union could remain a major threat to U.S. security. There are cogent arguments on both sides of the issue. But if the Soviet Union were to remain a major threat, the Administration argues that it needs the improved capability that the Advanced Tactical Fighter would provide in order to ensure that U.S. aircraft remain superior to those of the Soviet Union. According to the Administration, the Soviet Union has deployed three new aircraft--the Mig-31, the Mig-29, and the Su-27--since the United States initially fielded the F-15 aircraft. The Administration also expects the Soviet Union to field two new Soviet fighter aircraft early in the next century, though some analysts believe Soviet economic problems may slow or prevent this continued modernization. Finally, the Administration has indicated concern about improvements in Soviet air defenses. These improved defenses argue for the stealth capability that the Advanced Tactical Fighter would provide.

Assessments of the capability of tactical air forces bear out concerns about Soviet capability. CBO assessed the capability of tactical air forces

using a scoring method that accounts for both the quantity and quality of aircraft. As of today, a rough parity of capability probably exists between the tactical air forces of the Soviet Union and those of NATO countries. If, however, the United States carries out its planned reduction to 26 wings and the NATO allies make proportional cuts, but the Soviet Union makes no further reductions in its tactical air forces, then the Soviet Union would enjoy an advantage over NATO countries in tactical aircraft scores--perhaps by as much as 1.4 to 1. Even if the Soviet Union eventually complies fully with the limits on aircraft in the treaty limiting Conventional Forces in Europe (CFE), the Soviets might still have an advantage of about 1.2 to 1.[1]

Other factors may offset this Soviet advantage. For example, some Soviet aircraft that are included in these comparisons may not be used to oppose NATO forces. Many Soviet aircraft, while capable of opposing allied forces, are intended to defend the Soviet homeland and so might be kept out of any offensive action. Moreover, comparisons of ground forces are more favorable to NATO than those for tactical air forces. Finally, these comparisons are based on measures that account only for the quantity and quality of aircraft. The measures do not reflect any differences in training, logistics support, or other factors, some of which may favor the United States.

1. For a more complete discussion of this topic, see the testimony of Robert F. Hale before the House Committee on Armed Services, March 19, 1991.

Nevertheless, these comparisons suggest that, if the Soviet Union remains a major military foe, one can make a case for maintaining at least the planned number of U.S. forces while also upgrading those forces to match improvements in Soviet capability.

Threats from Other Nations

It is also possible that domestic concerns and economic problems might cause the Soviet Union to direct its attention inward, thus lessening the threat it poses to U.S. interests. This trend would drastically reduce the threats posed to U.S. tactical air forces because the capabilities of potential adversaries other than the Soviet Union are much more modest. Comparisons based on the number and quality of tactical aircraft suggest that the United States enjoys overwhelming advantages in tactical aircraft over a wide range of potential adversaries, such as Cuba, North Korea, and the prewar forces of Iraq. Even after the planned reduction in U.S. forces to 26 wings, the U.S. advantage would range from a low of four to one to a high of sixteen to one.

Moreover, other factors not captured in these numbers may favor U.S. tactical air forces in conflicts against nations other than the Soviet Union. Air defenses in other nations are less capable. U.S. military personnel are almost certainly better trained than those in most other nations. Moreover, at least

when inexperienced hands operate Soviet weapons, recent experience in the Persian Gulf suggests that their capability is less than what the Administration would have predicted.

Thus, against nations other than the Soviet Union, the United States might not need the major improvements in capability that the Advanced Tactical Fighter or a substantially more capable Multirole Fighter would provide. Indeed, some military analysts would argue that, if the Soviet Union is not the key threat, the Air Force needs to focus on enhancing its ability to attack ground targets rather than buying an Advanced Tactical Fighter that is designed primarily to attack enemy aircraft.

After assessing likely future threats, the Administration has apparently decided to purchase more capable aircraft while also attempting to maintain 26 air wings in the years beyond 1995. The Administration should have no trouble maintaining its desired force level in the 1990s, but the outlook is much less rosy in the longer term.

MEETING NUMERICAL REQUIREMENTS FOR 1992-1999

In 1992 through 1997, the Administration plans to buy only 72 F-16 aircraft and 8 Advanced Tactical Fighters. This level of procurement--averaging 13 planes a year--is extremely low by historical standards and well below the 150 aircraft that the Air Force believes are needed to sustain the fleet (see Figure 1). Funding for procuring new aircraft should total roughly $4.5 billion.[2]

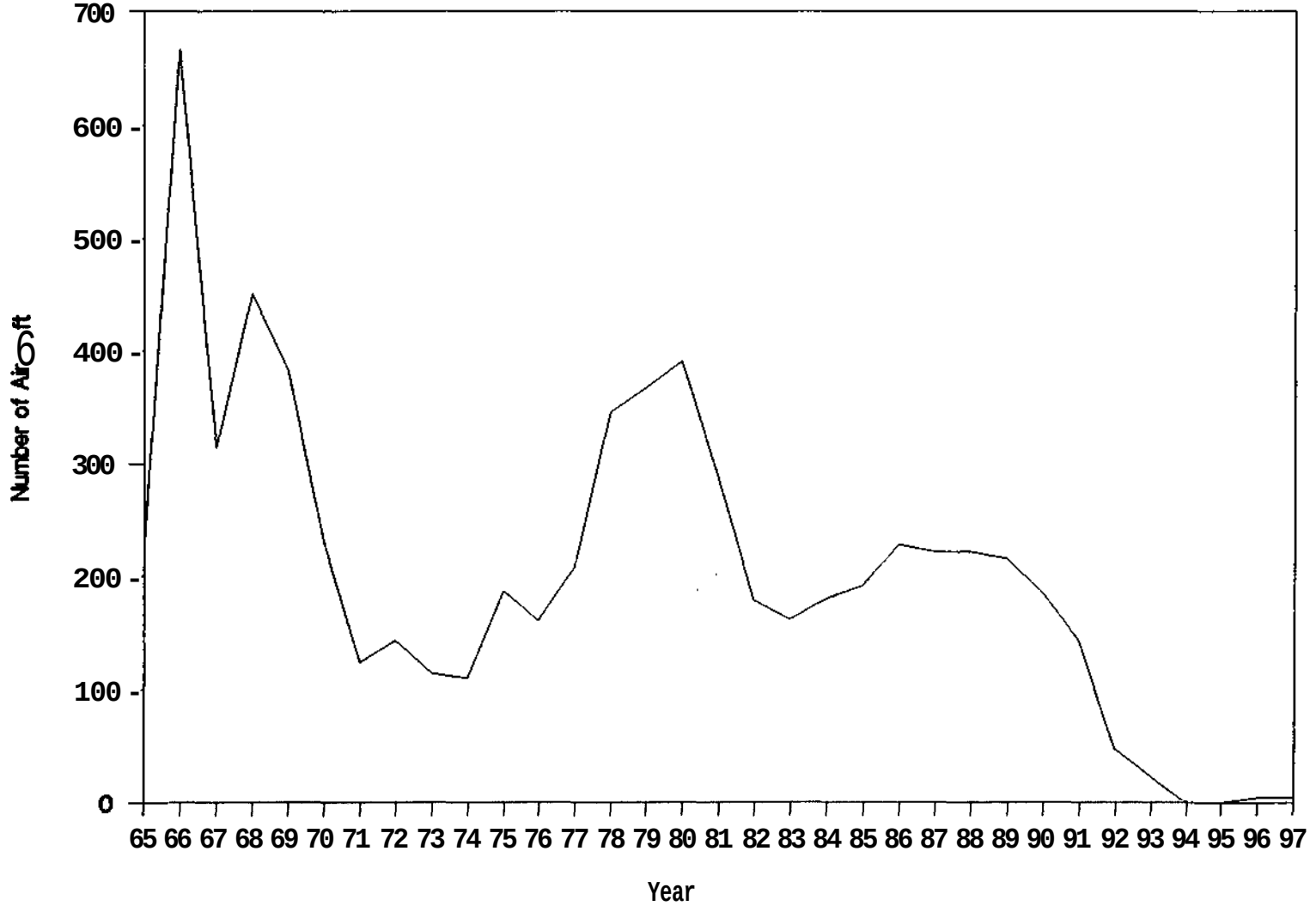
The Administration does plan substantial funding to develop new aircraft between 1992 and 1997. Development for the ATF would receive a total of $10.1 billion in 1992 dollars. Development of the Multirole Fighter would absorb $0.5 billion.

Inventories and Requirements

Making the reduction from 35 wings to 26 wings should offset planned low rates of procurement. Thus, the Air Force should easily meet its numerical requirements for tactical aircraft through 1999, the first year when all aircraft purchased between 1992 and 1997 will be in the fleet (see Figure 2).

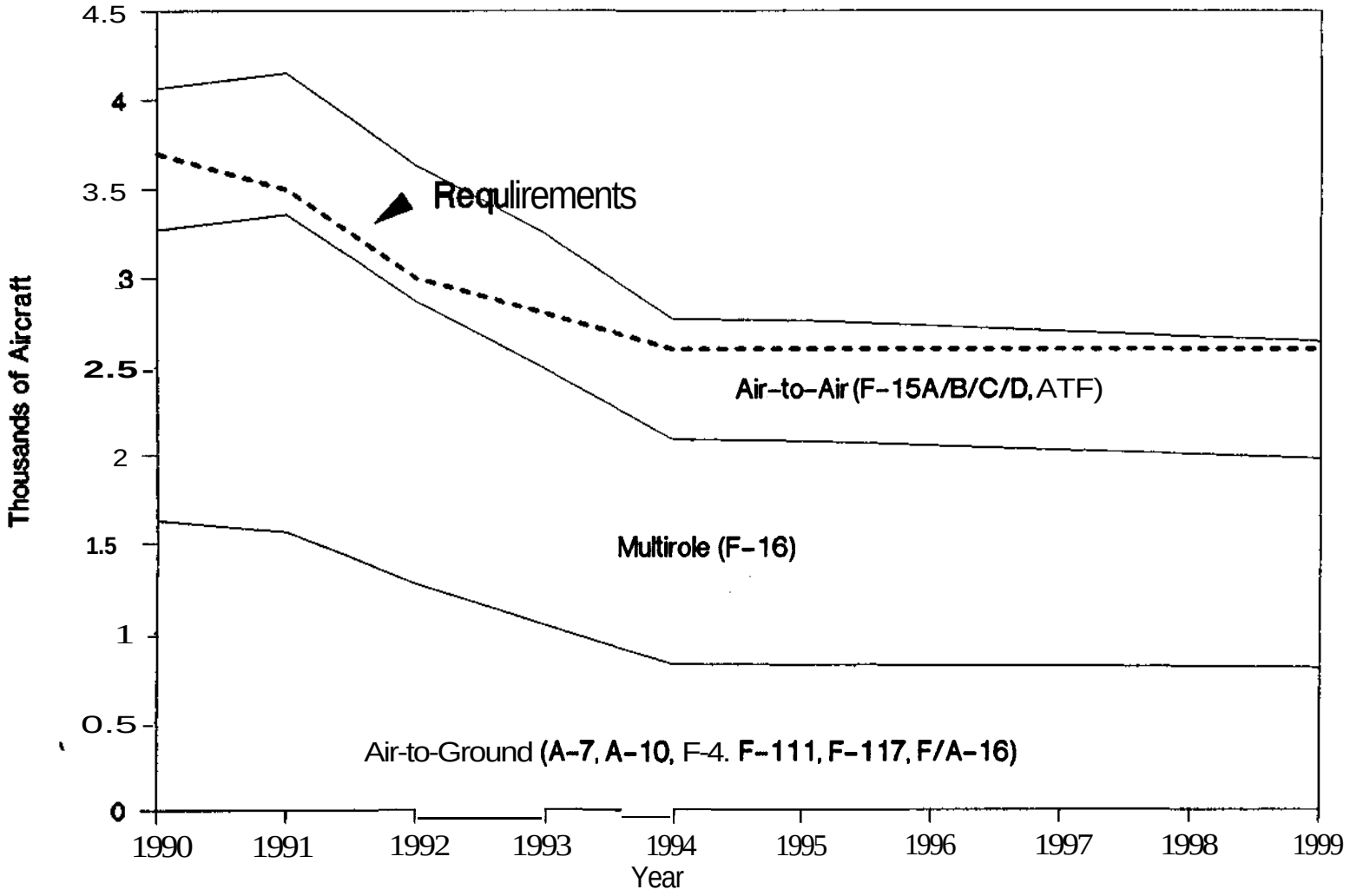
2. Data publicly available on the Administration's plans do not include procurement costs for the Advanced Tactical Fighters. CBO used Air Force data to produce a phased estimate of those costs.

Figure 1. Air Force Procurement of Fighter/Attack Aircraft, 1965-1997



SOURCE: Congressional Budget Office.

Figure 2. Requirements and Inventories for Air Force Tactical Fighter Wings (The Administration's Fiscal Year 1992 Plan)



SOURCE Congressional Budget Office based on Air Force data.
NOTE Excludes fighter interceptor squadrons and other fighter requirements.

Requirements for tactical aircraft fall sharply during this period, from about 3,700 aircraft in 1990 to about 2,600 aircraft by 1994. They would presumably remain at the level of 2,600 through 1999. To accommodate these sharply reduced requirements, the Air Force will actually have to retire a number of aircraft before they reach the end of their services lives--defined as the time the aircraft suffer structural fatigue. During the period from 1992 to 1994, if decreases in aircraft inventories are consistent with planned force reductions, about 1,600 aircraft will be retired. Yet only about 150 of these aircraft would have reached the end of their service lives during this period. These early retirements mean that, during the remainder of the 1990s, few retirements would be dictated by service lives, which average 28 years for the various types of aircraft in the fleet today.

CBO's estimates of aircraft requirements are based on Air Force estimates that about 100 planes are needed to maintain one wing (72 operational aircraft are required for a wing in addition to other aircraft that are involved in overhaul, training, and other uses). Requirements in 1994 and later years assume that the Air Force maintains 26 wings. Requirements for certain types of tactical aircraft, such as fighter interceptors, are not included in CBO's estimates because of uncertainty about the size of future requirements.

Average Age

The Air Force would not only meet its numerical goals for aircraft through 1999; it would also meet its goal for average aircraft age, at least through 1997. The service goal--to retire aircraft after 22 years of service and so maintain a fleet that on average is no more than 11 years old--calls for retirement before the end of the plane's service life, which is dictated by structural fatigue. The Air Force seeks to retire aircraft before they wear out because the service believes that retaining aircraft much longer than 22 years would cause planes to be less modern than the aircraft they might have to fight. As the service terms it, an older fleet would be "obsolescent in the face of the threat."

Assuming the Administration's planned buys of aircraft, and CBO's estimate of the number of retirements, the average age of the Air Force's inventory of tactical aircraft declines through 1994--from about ten years in 1991 to less than nine years in 1994--reflecting the retirement of older aircraft (see Figure A-1 in the Appendix to this testimony). Average age then rises sharply during all the remaining years through 1999.

Despite this increase, average age exceeds the Air Force's goal of 11 years only slightly in 1997. By 1999, however, average age reaches more than

13 years, 2 years above the Air Force goal. This aging fleet suggests a problem that is captured more fully in CBO's analysis of the long-term outlook for meeting numerical aircraft requirements.

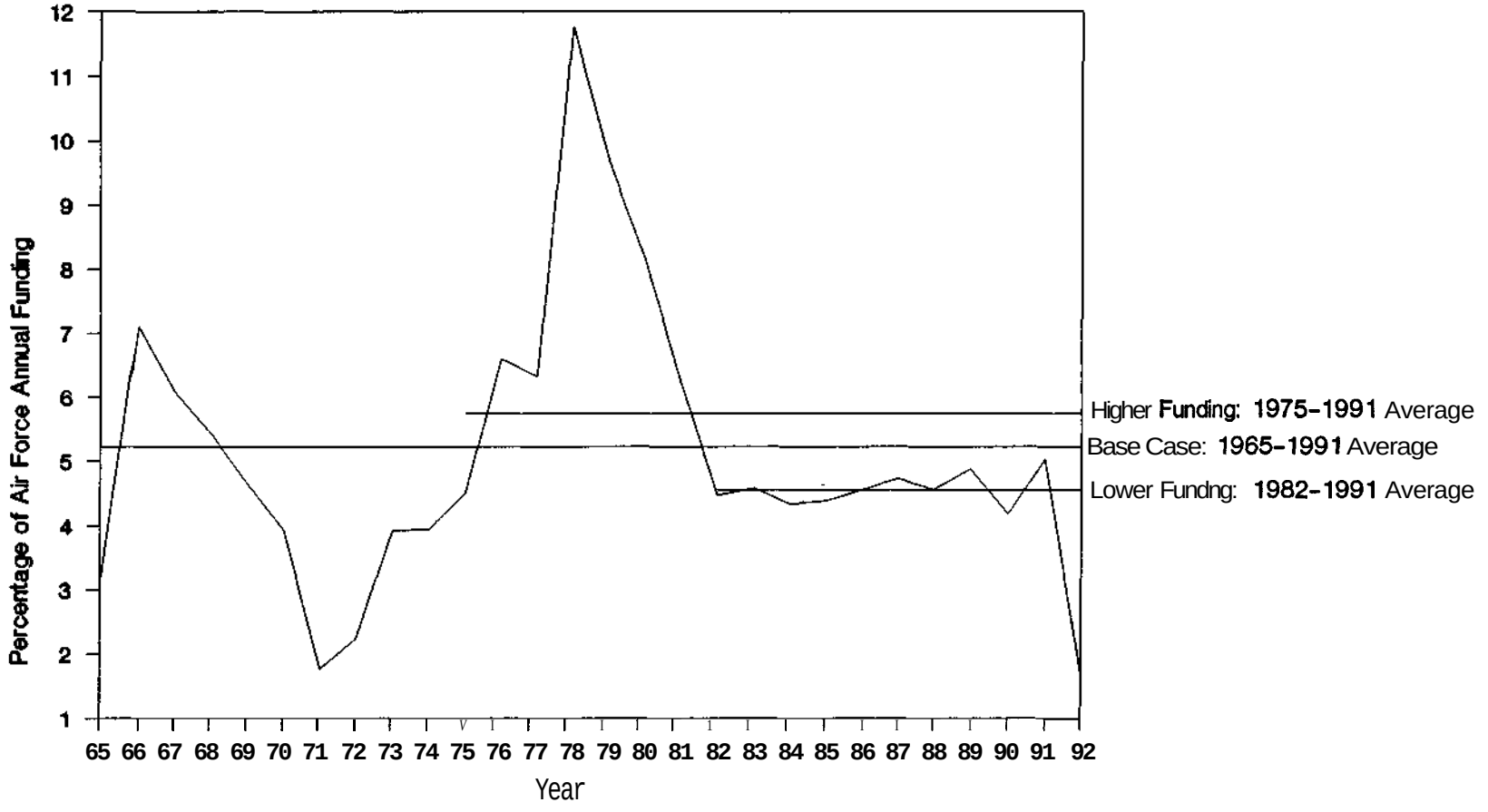
MEETING NUMERICAL REQUIREMENTS IN THE LONG TERM

The Administration will have difficulty maintaining a force of 26 wings in the long term. Two factors have the greatest influence on the long-term size of inventories of tactical aircraft: how much money the service can spend on the planes and how much each plane costs.

Available Levels of Funding

It is impossible to know for sure how much funding will be available to buy tactical aircraft in the next century. To illustrate a possible level of funding consistent with past history, CBO calculated a base-case estimate assuming that tactical aircraft receive the same average share of total Air Force funding (5.2 percent) as they received in the years since 1965. This average includes two periods when tactical aircraft received a larger than average share of the Air Force budget and one period when the aircraft received a below-average share (see Figure 3). We applied the 5.2 percent to Administration estimates of available Air Force funding in 1995, the year when all the budgetary

Figure 3. Percentage of Air Force Budgets for Procurement of Fighter/Attack Aircraft, 1965-1992



SOURCE: Congressional Budget Office from historical budget and Air Force data.

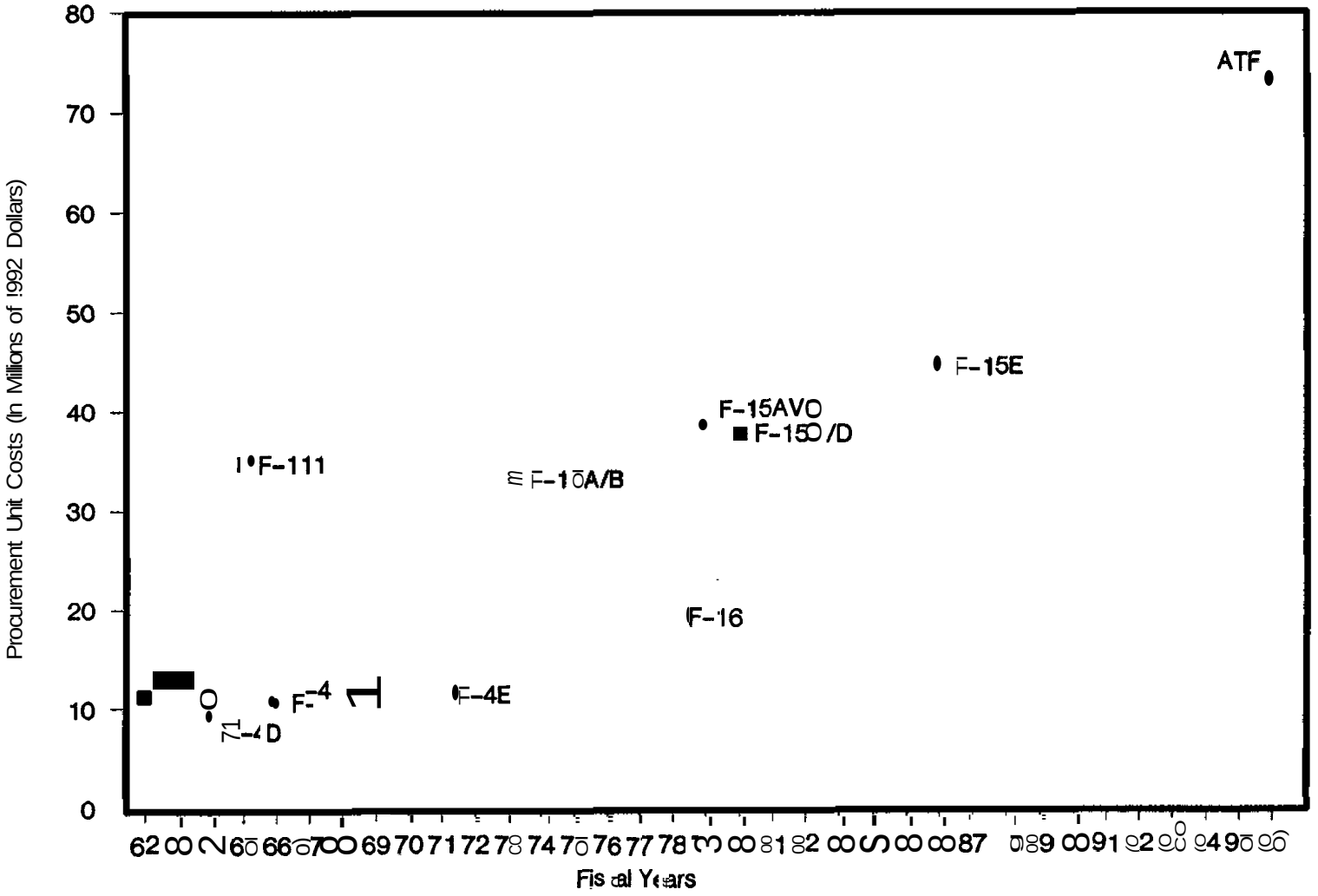
reductions required under the Budget Enforcement Act of 1990 will be carried out. The resulting level of available funding ($4.3 billion) is about six times the average level of funding that the Administration plans to devote to buying new tactical fighters during the years from 1992 through 1997.

Aircraft Costs

Aircraft costs are also important in estimating how many tactical aircraft the Air Force can maintain over the long term. For its base-case estimate, CBO used the Air Force's current estimate for the average cost to procure an Advanced Tactical Fighter--about $73 million. At this price, the Advanced Tactical Fighter would cost substantially more most than most other Air force tactical fighters (see Figure 4).

No Air Force estimate is available for the cost of the Multirole Fighter. In its base case, CBO assumes that each Multirole Fighter would cost about $35 million. Because the Administration plans to end production of the F-16 aircraft, CBO assumed that the Multirole Fighter would be an entirely new aircraft rather than a derivative of the F-16 aircraft. We arrived at our estimate of $35 million by increasing current F-16 costs by 80 percent, the least amount of growth experienced at any time since 1950 when moving from one generation of aircraft to the next.

Figure 4. Aircraft Procurement Unit Costs Versus First Procurement Year



SOURCE: Congress Budget Office based on Air Force data.
NOTE: Program averages plotted at rough midpoint of program.

Other Assumptions

In its base case, CBO also made other assumptions that are key to estimating long-term inventories. To be consistent with Air Force plans and goals, we assumed that about 21 percent of future forces are made up of Advanced Tactical Fighters. Another 12 percent of the inventory, which consists of long-range bombers, is assumed to consist of a plane costing the same as the Advanced Tactical Fighter. Thus, about 33 percent of future tactical forces are assumed to be made up of highly capable aircraft; the remaining force is composed of Multirole Fighters. Consistent with the Air Force goal, tactical aircraft are assumed to remain in service for 22 years. Annual losses from peacetime accidents (attrition) are assumed to amount to about 1 percent a year.

Based on these assumptions, CBO estimated the number of wings that the Air Force would be able to maintain in the year 2025. While few reading or listening to this testimony will be concerned with Air Force tactical aircraft by the year 2025, keep in mind that it is the first year when the choices discussed in this testimony today will determine all of the aircraft in the Air Force inventory. Indeed, their impact may be felt sooner, perhaps by the end of the next decade.

Shortfalls Under Long-Term Projections

If funding levels and aircraft prices remain at the levels CBO assumed in its base case, then the Air Force would be able to maintain only about 18 wings of tactical aircraft in the long term (see Table 1). This level would be about 8 fewer wings than the Air Force plans to have in 1995 and 17 fewer wings than it has now. Clearly, at the prices the Air Force may have to pay for future tactical aircraft, historical budget shares applied to a constant total Air Force budget do not provide enough funds to equip 26 wings.

Increased Funding. Of course, it is possible that the Air Force will get more money. Sustained real growth of about 2 percent a year above the 1995 level of funding for tactical aircraft would permit the Air Force to maintain 26 wings if all the other assumptions in the base case remain unchanged.

While this annual growth may seem modest, the growth in actual dollars is substantial. Annual growth of 2 percent a year implies an increase of about 45 percent in average funding for tactical aircraft during the next several decades from $4.3 billion to about $6.3 billion. It may be risky to assume any sustained growth in defense budgets, particularly in a period when threats to U.S. security have declined and may continue to decline.

TABLE 1. AVAILABLE WINGS UNDER VARIOUS ASSUMPTIONS

Assumptions	Available Wings in 2025
Base Case	18
More Favorable Assumptions	
Base Case but Share of Funds Grows[a]	20
Base Case but Average Age at Retirement Is 28 Years	22
Base Case but Multirole Fighter Costs Less[b]	21
Base Case but Air Force Accepts Smaller Share of Most Capable Planes	20
Less Favorable Assumptions	
Base Case but Share of Funds Declines[c]	16
Base Case but ATF Costs More[d]	15
Base Case but ATF Costs Substantially More[e]	12

SOURCE: Congressional Budget Office.

a. Average 1975 to 1991 share.
b. Approximate contractor estimate ($25 million).
c. Average 1982 to 1991 share.
d. F-15 A/B models to F-4 ($100 million).
e. F-15 (all models) to F-4 ($135 million).

More Favorable Assumptions. Even if the whole Air Force budget does not increase, tactical fighter aircraft might receive a larger share of the Air Force budget. If the long-term share grew to 5.8 percent (the average for the years 1975 to 1991), rather than the 5.2 percent assumed in the base case, then the Air Force could maintain 20 wings over the long run (see Table 1). If funds do not grow, but the Air Force keeps planes until they wear out at about 28 years rather than replacing aircraft after 22 years to maintain a modern fleet, then the service could maintain 22 wings.

The Air Force might also hold down the cost of the Multirole Fighter below levels assumed in the base case. The base case assumes that an entirely new aircraft is designed as a Multirole Fighter. The Air Force could modify existing F-16 aircraft rather than developing a new plane. Estimates by the contractor suggest that one plausible set of modifications to the F-16 aircraft, including a change to the shape of the wings to hold more fuel and modest improvements to the engine, might increase its cost to around $25 million. If this modified F-16 aircraft--designated the Falcon 21 by the contractor who builds F-16 planes--becomes the Multirole Fighter and costs only $25 million apiece, then the Air Force could maintain 21 wings over the long term.

The Air Force could also purchase less expensive planes for its long-range bombing mission, or simply decrease the number of more capable planes it has in its inventory. If the share of tactical forces made up of the most capable planes fell to 21 percent, the Air Force could maintain about 20 wings in its future forces.

Unfavorable Assumptions. Unfortunately, while some favorable assumptions suggest less of a problem, one can also point to unfavorable ones that may be just as plausible. In future years, the Air Force may be investing heavily in satellites and other space-based assets. Tactical aircraft could receive a smaller share of the Air Force's budget, perhaps only 4.6 percent (the average for the years 1982 to 1991) rather than the level Of 5.2 percent assumed under the base case. With a smaller share of the budget, the Air Force can maintain only 16 wings in the long term (see Table 1).

The number of wings the Air Force could maintain would also fall if the costs of the Advanced Tactical Fighter increase above planned levels. It would be prudent to assume some cost growth for several reasons. Estimated costs have increased in the last year. Also, the cost growth of the Advanced Tactical Fighter is low by historical standards.

At its currently estimated price of $73 million apiece, the Advanced Tactical Fighter will cost 90 percent more than the average cost of all the versions of the F-15 aircraft (see Table A-1 in the Appendix). In several cases since 1950, however, the percentage increases in costs associated with shifting from one generation of aircraft to the next have been much larger than 90 percent. If the cost of the Advanced Tactical Fighter grows to about $100 million apiece (consistent with the growth in cost experienced between the A/B version of the F-15 aircraft and its predecessor the F-4), then the Air Force would be able to maintain only 15 wings in the long term. If the Advanced Tactical Fighter eventually costs about $135 million apiece (matching growth in cost between the average version of the F-15 aircraft and the F-4), the Air Force would be able to maintain only 12 wings.

26 Wings: A Risky Bet

In sum, in order to maintain 26 wings over the long run, the Air Force would have to achieve sustained increases in funding for tactical aircraft. Alternatively, it would have to realize a combination of the favorable assumptions that the testimony discusses--for example, extending service lives to 28 years and holding down the cost of the Multirole Fighter--and hope that their benefits are not offset by other, unfavorable assumptions.

Perhaps as likely as these favorable outcomes are unfavorable events that could produce a drastic reduction in the size of the tactical Air Force. Assume, for example, that tactical aircraft receive a smaller share of the Air Force budget or that they maintain their share while the entire Air Force budget continues to decline in the years beyond 1995. If this outcome is combined with substantial increases in the costs of the Advanced Tactical Fighter (to a level of $135 million apiece), the Air Force would be able to maintain only about 11 wings. Such a small fleet of tactical aircraft--less than one-third the size of today's fleet-would probably be unable to carry out future missions such as those required in the Persian Gulf war.

SOLUTIONS THAT MEET LONG-TERM NUMERICAL REQUIREMENTS

Because of the potential for reductions, perhaps drastic reductions, in the long-term size of the tactical Air Force, the Congress might want to examine alternative policies. The alternatives in this testimony are designed to permit the Administration to maintain approximately 26 wings without increases in funding. The alternatives would also minimize reductions in the number of Air Force wings in the event of unfavorable trends in funding or the cost of new aircraft.

Continue Producing Current Fighters

The Air Force could forgo producing the Advanced Tactical Fighter and instead continue to produce F-15 and F-16 aircraft. This approach would have important effects in the long run as well as the near term.

Long-Term Effects. In the long term, this approach would permit the Air Force to maintain about 26 wings of tactical aircraft. This result assumes that about one-third of the 26 wings are F-15 aircraft (for the sake of making its estimates, CBO assumed that the new F-15 aircraft costs about $50 million, modestly more than today's Strike Eagle version). The other two thirds of the fleet are assumed to be modestly improved versions of the F-16 aircraft (the Falcon 21) that cost about $25 million apiece.

Such a force would not have as much stealth capability as the fleet of tactical aircraft that the Air Force plans. Nor would a combination of F-15 and improved F-16 aircraft have the same avionics and other capability that would be inherent in a fleet containing Advanced Tactical Fighters. Finally, the F-15 fleet, especially those aircraft produced in 1973, may have come close to exhausting its potential for further improvements in capability.

On the other hand, a fleet of F-15 and F-16 aircraft might make sense if the Soviet Union was no longer a major threat to U.S. security or if Soviet economic woes make extensive modernization of its fighter aircraft unlikely. Moreover, modified versions of current fighters may well be adequate to handle air threats posed by nations other than the Soviet Union. Because it buys more of the F-15E Strike Eagle, this approach would also permit the Air Force to replace its aging fleet of F-111 long-range bombers, thus preserving a capability that could be especially important in conflicts against nations other than the Soviet Union. Finally, in contrast to the Administration's program, this approach would keep production lines for Air Force fighter aircraft open in 1994 and 1995.

Near-Term Changes. Pursuing this approach would require important changes in the Administration's plan for tactical aircraft in 1992-1997. Under this approach, the ATF program would have to be ended in 1992. A program to make modest modifications in the F-16 aircraft would be instituted at a cost in the 1992-1997 period approximately equal to what the Administration planned to spend to develop a new aircraft as the Multirole Fighter. In addition, procurement of both F-15E and F-16 aircraft would continue at low levels, resulting in the purchase of an additional 72 F-15E aircraft and 96 F-16 aircraft during the period from 1992 to 1997. (Table 2 summarizes these changes.)

TABLE 2. NEAR-TERM CHANGES UNDER ALTERNATIVES COMPARED WITH THE ADMINISTRATION'S PLAN

Alternatives	Additional Aircraft Purchased in 1992-1997		Savings/Costs (-/+) (In billions of 1992 dollars)		
	F-15	F-16	1992	1993	1992-1997
Continue Procuring Current Fighters	72	96	-0.4	-0.8	-0.3
Buy Only Upgraded Versions of F-16 Aircraft	0	104	-0.5	-0.6	0.6
Silver Bullet Force with Low-Cost Multirole Fighters[a]	0	96	0.0	0.1	4.4

SOURCE: Congressional Budget Office estimates.

a. Additional funds needed if Advanced Tactical Fighter program continues on schedule.

Compared with the Administration's plan, this approach should require almost the same amount of total funding during the 1992-1997 period. The savings from canceling the ATF program offset the added costs of buying small numbers of additional F-15E and F-16 aircraft, producing total savings of $0.3 billion over the period. Savings in 1992 and 1993, totaling about $1.2 billion, are partially offset by added costs of about $0.9 billion in last four years of the plan.

Buy Only Upgraded Versions of the F-16

A second approach would again cancel the ATF program but would incorporate many of the technological improvements developed for the ATF aircraft into some F-16 aircraft. These radically modified F-16 aircraft, designated by the contractors as the Falcon 21++, would include the new engine and avionics package intended for the Advanced Tactical Fighter as well as other improvements. The Falcon 21++ would, of course, cost significantly more than an existing F-16 aircraft--perhaps as much as 70 percent of the Air Force estimate of the cost of the Advanced Tactical Fighter, or about $50 million apiece. This option also assumes that the Air Force buys a plane (perhaps a variation of the Falcon 21++ or the Navy's AX aircraft) costing the same as the Advanced Tactical Fighter for its new long-range bomber.

Long-Term Effects. In the long run, the Air Force could maintain a fleet of 24 wings to 26 wings under this option. The Air Force could maintain 24 wings if about 21 percent of those wings are Falcon 21++ aircraft, 12 percent(those used as long-range bombers) have a cost comparable to that of the Advanced Tactical Fighter, and the other 67 percent consist of less extensively modified F-16 aircraft (the Falcon 21). To maintain 26 wings under this approach, the Air Force would have to accept a force in which a smaller fraction, about one-quarter, consists of the expensive types of aircraft--either the Falcon 21++ or a new long-range bomber.

This approach would reduce the capability of a future fleet, including its capability to evade enemy detectors. Details about the degree of stealth and performance of planned aircraft are highly classified. However, the Falcon 21++ aircraft would not have as much stealth capability as the Advanced Tactical Fighter. The shape and other design features of an aircraft determine its degree of stealth, and these features can be modified more extensively on new aircraft than on an existing ones. Nor, in all likelihood, would all the aircraft in this alternative fleet have the range of a fleet that included Advanced Tactical Fighters.

This alternative fleet would, however, possess substantially more stealth capability than the Air Force's current fleet of tactical aircraft. This

improvement might be acceptable if the primary threat to U.S. security consists of tactical aircraft from nations other than the Soviet Union. Moreover, this approach includes funds for development of the advanced engines and avionics that would be used on the Advanced Tactical Fighter, which provides a hedge against Soviet advances.

Near-Term Changes. Like the previous approach, this one would require cancellation of the ATF development program in 1992. In its place, the Administration would pursue development of the Falcon 21+ +, the radical improvement to the F-16 aircraft, and the Falcon 21, the more modest F-16 enhancement. This alternative would also continue purchases of an additional 104 F-16 aircraft of various versions.

Total costs under this alternative in 1992 to 1997 should approximately equal those of the Administration's plan, requiring added costs of perhaps $0.6 billion over the six years. Modest annual near-term savings of about $0.5 billion in 1992 and 1993 would be offset by costs of $1.7 billion in the remaining four years of the plan. Costs in 1992-1997 would be lower and savings higher if production of the existing F-16 aircraft were ended while the Falcon 21 ++ is being developed.

Silver Bullet Force with Low-Cost Multirole Fighters

The Congress could decide that, because of uncertainty about future threats, it wants to proceed now with full-scale development of the Advanced Tactical Fighter. If increased funds are not available when the time comes to buy the Advanced Tactical Fighter, the Congress could elect to buy only a very few of these highly capable fighters. This small force of the most capable fighters—"silver bullets"—would be used against the most capable adversaries.

Long-Term Effects. If such a silver bullet force is to consist of a full 26 wings, then the Multirole Fighter must not cost too much more than today's F-16 aircraft. The cost of the Multirole Fighter is particularly important under this approach because the plane would make up most of the fleet. Assume, for example, that only 10 percent of the future fleet of tactical fighters and long-range bombers consists of Advanced Tactical Fighters. The other 90 percent consists of modified versions of the F-16 (the Falcon 21), which cost about $25 million apiece. Under these assumptions, the Air Force could, over the long run, maintain a fleet of 26 wings. (The estimate of 26 wings assumes that the cost of the Advanced Tactical Fighter grows from the current Air Force estimate of $73 million to about $100 million apiece because of the higher costs associated with a small buy of the planes.)

Thus, under this approach, the Air Force could maintain its planned size of 26 wings. The approach should also minimize the chances of a drastic decline in the size of the Air Force in the event of unfavorable trends in funding or ATF costs. Moreover, this approach creates an open production line for Advanced Tactical Fighters that could be used to produce more of these capable fighters in the event that threats to U.S. security demand more capability.

Would such a silver bullet force meet security needs? Perhaps, particularly if threats to U.S. security stem primarily from countries other than the Soviet Union. Indeed, this approach would mirror the current situation with the F-117 aircraft. The Air Force has only a small fleet of these fighters with stealth capability. Yet it used them with great success to attack targets in the Persian Gulf that might have been difficult to destroy with aircraft having less stealth capability.

The benefits of this approach will be fully realized, however, only if the cost of the Multirole Fighter is held down-under CBO's assumptions to around $25 million apiece. If the cost of this aircraft grows, the number of Air Force wings would shrink well below 26, even if the number of highly capable aircraft is limited. The history of growth in costs suggests that a Multirole Fighter costing $25 million apiece is only likely to be realized if it

is a derivative of an existing plane--presumably, in this case, the F-16. The development of an entirely new aircraft, as the Air Force apparently plans, has in the past always resulted in much larger increases in cost.

Near-Term Changes. Thus, if the Congress wants to maintain the option of pursuing this approach, it would probably have to continue production of the existing F-16 aircraft and develop a modestly modified version of the F-16 as a low-cost Multirole Fighter. Continuing purchases of F-16 aircraft at annual rates of 24 aircraft in 1994 through 1997 would result in the purchase of 96 additional F-16 aircraft compared with the Administration's plans. Added funds of about $4.4 billion in 1992-1997 would be needed to pay for these extra planes.

To offset these added costs, the Congress could reduce funding for the ATF development program. If cuts in ATF development funds must fully offset the added costs, then total ATF funds in the years 1992 to 1997 would have to be reduced by about 35 percent. Funding reductions to the program would be much higher than that in later years of the period, up to about 50 percent in 1995 through 1997.

This funding cut would delay ATF deployment for at least several years. Such a delay may be reasonable in view of uncertainty about the

nature of future Soviet threats. Indeed, a delay would provide time to ascertain how that threat is developing. A delay would, however, extend a development program that is already long by historical standards and would add to the total cost of developing the Advanced Tactical Fighter. Thus, the Congress could decide to maintain the pace of the ATF development program and offset the added costs of this option through reductions in the other programs of the Air Force or the other services.

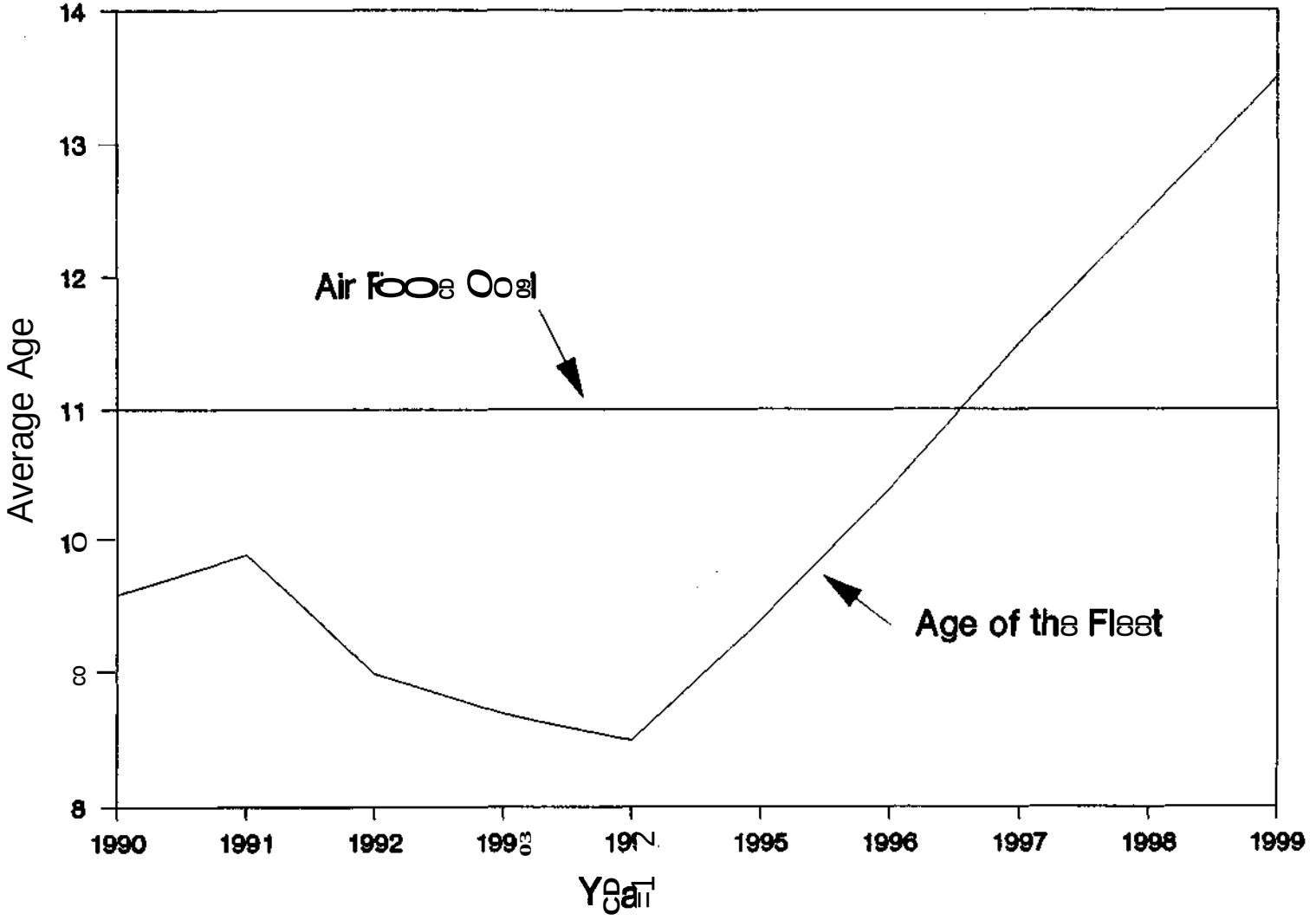
CONCLUSION

If the Air Force pursues its current plan to develop and buy an Advanced Tactical Fighter and a new Multirole Fighter, the tactical aircraft program stands a good chance of eventually either requiring sustained increases in funding or falling well short of maintaining the 26 wings now planned. Although these problems will not be evident until the next century, the decision the Congress will make this year about the Advanced Tactical Fighter will be important in shaping the long-term outlook. Because of the importance of this decision, the Congress may wish to consider alternatives such as a small, silver bullet force of Advanced Tactical Fighters or the purchase of upgraded versions of the F-16 aircraft.

Also key to shaping long-term trends for tactical aircraft is the decision that the Administration and the Congress will make in the next several years regarding continued production of the F-16 aircraft. If the history of aircraft cost changes is a guide, continued production of F-16 planes will be necessary if the Air Force is to achieve a relatively low-cost Multirole Fighter. The Administration must hold down the costs of the Multirole Fighter if it hopes to maintain 26 Air Force tactical fighter wings in the next century without substantial increases in funding.

APPENDIX A. FIGURE AND TABLE

Figure A-1. Average Age of Tactical Aircraft, 1980-1998
(Administration's Fiscal Year 1992 Plan)



SOURCE: Congressional Budget Office based on Air Force data.

TABLE A-1. RATIOS OF AIRCRAFT COSTS

Aircraft	Percentage Growth in Unit Costs
ATF (Using Current Air Force Estimate) to F-15 Average[a]	90
F-16 Average to F-4 Average[a]	80
F-4C to F-100[bc]	80
F-111 to F-105[b]	190
F-15A/B to F-4 Average[a]	205
F-15 Average to F-4 Average[a]	260

SOURCE: Congressional Budget Office estimates.

a. Compares procurement unit costs in 1992 dollars.

b. Compares flyaway costs in 1992 dollars.

c. Some analysts argue the F-86 is a more appropriate choice for the F-4's predecessor. The F-4's costs were 400 percent higher than the F-86.